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(54) RECORDING METHOD AND APPARATUS

(57)Abstract:

PROBLEM TO BE SOLVED: To change the thickness of a protection layer by calculating the energy of recording the protection layer from the brightness component extracted from the image data of an N component and recording the protection layer according to the value.
SOLUTION: A brightness component calculating device 7 receives Y, M, C data from a recording color data generating device 3 by one element for each time so a to convert the same to a brightness component. A protection layer recording gradation converting device 9 receives the brightness component of the pixel from the brightness component calculating device 7 so as to output the energy for recording the protection layer according to the received value. In recording the protection layer, a head data generating means 4 receives the output from the protection layer recording gradation converting device 9 and convert the same into a signal form so that a thermal head 5 can record this on a recording paper for recording (transferring) the protection layer on the recording paper. Therefore, the protection layer can be recorded according to the brightness of the image to be recorded, and thus the thickness of the protection layer can be changed according to the brightness component of the inputted image signal.
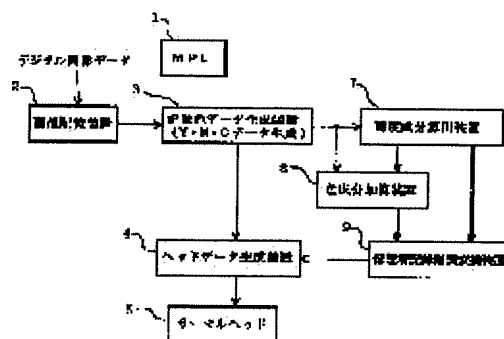
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CLAIMS

[Claim(s)]
[Claim 1] The record approach characterized by to compute the energy of the protective layer
record from the brightness component which extracted and extracted the brightness component
from the image data of N classification by color in the record approach which records a
protective layer on it, and to record a protective layer according to the value after used and
carried out N time vertical scanning of the ink or the ink sheet of N color (N is a positive
number) to the recording paper and recording the image of N color.
[Claim 2] The record approach according to claim 1 characterized by imprinting a protective
layer with fixed energy all over the recording paper before recording the protective layer
according to a brightness component.
[Claim 3] The record approach according to claim 1 characterized by imprinting a protective
layer with still more fixed energy all over the recording paper after computing the energy of
protective layer record from the brightness component and recording a protective layer
according to the value.
[Claim 4] The record approach of claim 1 characterized by computing the energy of protective
layer record for it after adding the color component data of arbitration to the extracted
brightness component, and recording a protective layer on it according to the value thru/or
claim 3 given in any 1 term.
[Claim 5] The record approach according to claim 1 characterized by computing the energy of
protective layer record from the brightness component by which profile emphasis was carried
out, and recording a protective layer according to that value after memorizing the extracted
brightness component and giving profile emphasis to a certain brightness component by making
this memorized display brightness component data into a reference pixel.
[Claim 6] The record approach according to claim 5 characterized by computing the energy of
protective layer record from a brightness component further, and recording a protective layer
according to the value after imprinting a protective layer with fixed energy all over the recording
paper, before recording a protective layer according to the brightness component which gave
profile emphasis.
[Claim 7] The record approach according to claim 5 characterized by imprinting a protective
layer with still more fixed energy all over the recording paper after computing the energy of
protective layer record from the brightness component which gave profile emphasis and
recording a protective layer according to the value.
[Claim 8] The record approach of claim 5 characterized by computing the energy of protective
layer record for it after adding the color component data of arbitration to the brightness
component which gave profile emphasis, and recording a protective layer on it according to the
value thru/or claim 7 given in any 1 term.
[Claim 9] Change into the energy of protective layer record of the extracted brightness
component, memorize the changed brightness component after conversion, and this memorized
brightness component data after conversion is used as reference data. The record approach
according to claim 1 characterized by computing the energy of protective layer record from the
brightness component after conversion by which profile emphasis was carried out, and recording

a protective layer according to the value after giving profile emphasis to a certain brightness component after conversion.

[Claim 10] The record approach according to claim 9 characterized by computing the energy of protective layer record from the brightness component after conversion further, and recording a protective layer according to the value after imprinting a protective layer with fixed energy all over the recording paper, before recording a protective layer according to the brightness component after conversion which gave profile emphasis.

[Claim 11] The record approach according to claim 9 characterized by recording a protective layer with fixed energy all over the recording paper after computing the energy of protective layer record from the brightness component after conversion which gave profile emphasis and recording a protective layer according to the value.

[Claim 12] The record approach of claim 9 characterized by computing the energy of protective layer record after adding the color component data of arbitration to the brightness component after conversion which gave profile emphasis, and recording a protective layer according to the value thru/or claim 11 given in any 1 term.

[Claim 13] An image storage means to memorize the digital input image data which should be recorded on the detail paper, A record color data generation means to generate color data from the output of this image storage means, A head data generation means to change the output of this record color data generation means into the form outputted to a thermal head, A thermal head, a brightness component calculation means to extract a brightness component from the output of the above-mentioned record color data generation means, The recording device characterized by having the protective layer record gray-scale-conversion means which changes the output of this brightness component calculation means into the energy of the protection stratification, and is added to the above-mentioned head data generation means, and the control means which controls each above-mentioned means.

[Claim 14] The recording device according to claim 13 characterized by having a brightness component profile emphasis means to give profile emphasis to a certain brightness component by making into a reference sign the brightness component memorized by a storage means to memorize the output of a brightness component calculation means, or the output of a protective layer record gray-scale-conversion means, and the above-mentioned storage means.

[Claim 15] The recording device according to claim 13 or 14 characterized by having a color component addition means to add the color component from a record color data generation means to the protection stratification energy by the protective layer record gray-scale-conversion means.

[Claim 16] The recording device of claim 13 characterized by having a gradation data storage means for protective layers for imprinting a protective layer with fixed energy all over the detail paper thru/or claim 15 given in any 1 term.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention uses and carries out N time vertical scanning of the ink or the ink sheet of N color (N is a positive number) to the recording paper, and relates to the record approach and equipment equipped with the recording system of a protective layer (a lamination layer or overcoat layer) after recording an image especially on the recording paper about the record approach of N color hot printing and equipment which record the image of arbitration.
[0002]
[Description of the Prior Art] When a protective layer was recorded, regardless of the image data recorded before recording a protective layer, the conventional record approach recorded the protective layer by the fixed heating value all over the recording paper, or was recording the protective layer of fixed patterns, such as a checker, continuously all over the recording paper. Drawing 5 is the block diagram of a recording apparatus with the conventional protective layer recording system. In drawing 5 , 1 is MPU (CPU) which controls the digital circuit and system of a recording apparatus in the gross. 2 is image storage which memorizes the image data recorded on the detail paper in the form of digital data. Although the image data inputted is digital data, if R, G, and B which are the three primary colors of light may be memorized, respectively, Y (yellow), M (Magenta), and C (cyanogen) which are the complementary color of R, G, and B may be memorized. Moreover, in the case of the recording device of a video input etc., a luminance signal and a color-difference signal may be memorized. MPU1 controls the writing of the data of this store, and read-out. 3 is record color data generation equipment, and, in the case of the line printer which this recording device records per Rhine, and is recorded for every (here, referred to as Y, M, and C of an ink sheet) color, this changes into Y, M, and C data (gradation data) the image data which read a part for one-line record of each color from the image store 2 according to the data of the image store 2. As technique to change, it is mainly changed by the circuit and MPU according to a conversion formula.
[0003] 6 is the gradation data storage for protective layers for the protective layer recorded after recording the record colors Y, M, and C. When recording a protective layer with the same gradation (energy) all over the recording paper, the gradation data equivalent to the energy are stored. Although drawing 6 is an example of the pattern in the case of recording a protective layer and the checker is shown, the figure in drawing shows the gradation at the time of recording a protective layer, and the energy at the time of recording, so that a figure is large is large. When repeating the protective layer of a fixed pattern like a checker shown in drawing 6 in all directions and recording it, the pattern is memorized as data for the whole detail-paper surface, or a pattern is written in and memorized in the Rhine unit from MPU1. 4 is head data generation equipment and is changed into the signal aspect by which gradation data are received from record color data generation equipment 3 when recording Y, M, and C each color, gradation data are received from the gradation data storage 6 for protective layers on the other hand when recording a protective layer, and a thermal head 5 can record the received gradation data on the recording paper. 5 is a thermal head which records the data received from head data

generation equipment 4 on the recording paper (imprint).

[0004]

[Problem(s) to be Solved by the Invention] In the above conventional recording devices, when a protective layer was recorded, the pattern which consists of two or more dots as recorded with the same gradation all over the recording paper or shown in drawing 6 was repeated in all directions, and was recorded. That is, the image data and protective layer which were recorded by such conventional protective layer record approach did not have numeric data-relevance, and, as for the protective layer, had only the duty which protects the color (ink or ink sheet) recorded simply.

[0005] In case this invention was made in view of the above-mentioned point, and a protective layer is recorded by the protective layer according to the brightness component of an image at the same time it makes it possible to emphasize the impression and enjoyment of the recorded image, it is the boundary line of the shade of a protective layer. The record approach and recording device with which improve voice and the protective layer enabled it to record finely the condition of exfoliation of the ink sheet for protective layers applied to the recording paper to a protective layer from an ink sheet are offered.

[0006]

[Means for Solving the Problem] After it uses for and carries out N time vertical scanning of the ink or the ink sheet of N color (N is a positive number) to the recording paper and records the image of N color, the record approach concerning this invention extracts a brightness component from the image data of classification by color N, computes the energy of protective layer record from the extracted brightness component, and records a protective layer according to that value in what records a protective layer on it.

[0007] Moreover, before recording the protective layer according to a brightness component, a protective layer is imprinted with fixed energy all over the recording paper.

[0008] Moreover, after computing the energy of protective layer record according to a brightness component and recording a protective layer according to the value, a protective layer is imprinted with still more fixed energy all over the recording paper.

[0009] Moreover, after adding the color component data of arbitration to the extracted brightness component, the energy of protective layer record is computed for it, and according to the value, a protective layer is recorded on it.

[0010] Moreover, after memorizing the extracted brightness component and giving profile emphasis to a certain brightness component by making this memorized display brightness component data into a reference pixel, the energy of protective layer record is computed from the brightness component by which profile emphasis was carried out, and a protective layer is recorded according to that value.

[0011] Moreover, before recording a protective layer according to the brightness component which gave profile emphasis, after imprinting a protective layer with fixed energy all over the recording paper, the energy of protective layer record is further computed from a brightness component, and a protective layer is recorded according to the value.

[0012] Moreover, after computing the energy of protective layer record from the brightness component which gave profile emphasis and recording a protective layer according to the value, a protective layer is imprinted with still more fixed energy all over the recording paper.

[0013] Moreover, after adding the color component data of arbitration to the brightness component which gave profile emphasis, the energy of protective layer record is computed for it, and according to the value, a protective layer is recorded on it.

[0014] Moreover, after change into the energy of protective layer record of the extracted brightness component, memorize the changed brightness component after conversion and giving profile emphasis to a certain brightness component after conversion by using this brightness component data after conversion that memorized as reference data, the energy of protective layer record computes from the brightness component after conversion by which profile emphasis was carried out, and a protective layer makes record according to that value.

[0015] Moreover, before recording a protective layer according to the brightness component after conversion which gave profile emphasis, after imprinting a protective layer with fixed energy

all over the recording paper, the energy of protective layer record is further computed from the brightness component after conversion, and a protective layer is recorded according to the value.

[0016] Moreover, after computing the energy of protective layer record from the brightness component after conversion which gave profile emphasis and recording a protective layer according to the value, a protective layer is recorded with fixed energy all over the recording paper.

[0017] Moreover, after adding the color component data of arbitration to the brightness component after conversion which gave profile emphasis, the energy of protective layer record is computed, and a protective layer is recorded according to the value.

[0018] An image storage means to memorize the digital input image data which should record the recording apparatus concerning this invention on the detail paper, A record color data generation means to generate color data from the output of this image storage means, A head data generation means to change the output of this record color data generation means into the form outputted to a thermal head, A thermal head, a brightness component calculation means to extract a brightness component from the output of the above-mentioned record color data generation means, It has the protective layer record gray-scale-conversion means which changes the output of this brightness component calculation means into the energy of the protection stratification, and is added to the above-mentioned head data generation means, and the control means which controls each above-mentioned means.

[0019] Moreover, it has a brightness component profile emphasis means to give profile emphasis to a certain brightness component, by making into a reference sign the brightness component memorized by a storage means to memorize the output of a brightness component calculation means, or the output of a protective layer record gray-scale-conversion means, and the above-mentioned storage means.

[0020] Moreover, it has a color component addition means to add the color component from a record color data generation means to the protection stratification energy by the protective layer record gray-scale-conversion means.

[0021] Moreover, it has a gradation data storage means for protective layers for imprinting a protective layer with fixed energy all over the detail paper.

[0022]

[Embodiment of the Invention]

The gestalt 1 of implementation of this invention is explained about drawing below gestalt 1. of operation. Drawing 1 is the block diagram showing the recording apparatus concerning the gestalt 1 of operation. MPU to which 1 controls the digital circuit and system of a recording apparatus in the gross in drawing 1 (CPU), The image storage which can memorize the image data which records 2 on the detail paper as digital data, The record color data generation equipment which changes into Y, M, and C data (gradation data) the image data which read 3 from the image store 2, Y and M by which 7 was generated with record color data generation equipment 3, the brightness component calculation equipment which computes a brightness component from C data (extract), The color component adder to whom 8 adds the brightness component from the color component data from record color data generation equipment 3, and brightness component calculation equipment 7, The protective layer record gradation inverter which outputs the energy which 9 receives the brightness component of a pixel from brightness component calculation equipment 7, and records a protective layer according to this value, 4 is a thermal head which records head data generation equipment and the data which 5 received from head data generation equipment 4 on the recording paper (imprint). In addition, MPU1 is constituted so that each block of those other than a thermal head can be controlled (not shown, since connection becomes complicated here).

[0023] Next, actuation is explained. Although the image store 2 memorizes the digital image data inputted, this may memorize Y (yellow), M (Magenta), and C (cyanogen) which are the complementary color of R, G, and B, if R, G, and B which are the three primary colors of light may be memorized, respectively. Moreover, in the case of the recording device of a video signal input etc., a luminance signal and a color-difference signal may be memorized. MPU1 controls

the writing of the data of this image store 2, and read-out.

[0024] In the case of the line printer which this recording device records per Rhine, and is recorded for every (here, referred to as Y, M, and C of an ink sheet) color, record color data generation equipment 3 changes into Y, M, and C data (gradation data) the image data which read a part for one-line record of each color from image recording equipment 2 according to the data of the image store 2. As technique to change, it is mainly changed by the circuit and MPU according to a conversion formula. As the example, from R, G, and B data, the calculation approach typical as an approach of computing Y, M, and C data is performed for C of G, when, as for Y, R, G, and B ask for the complement of R in the case of the digital data respectively based on a binary system, as for M of B.

[0025] Brightness component calculation equipment 7 computes a brightness component from Y and M which were computed with record color data generation equipment 3, and C data. As an example of the calculation approach, the minimum value 0101 in them serves as [Y, M, and C data] a brightness component by 4 bits at the time of Y= 1101, M= 1000, and C= 0101, respectively. Brightness component calculation equipment 7 receives 1 pixels of Y, M, and C data at a time at any time, and changes them into a brightness component from record color data generation equipment 3. The protective layer record gradation inverter 9 receives the brightness component of a pixel from brightness component calculation equipment 7, and outputs the energy which records a protective layer according to this value. This protective layer record gradation inverter 9 consists of a function or a look-up table. For example, in the case of a function, if it explains using a degree type (A), the inputted brightness component serves as input data (X) of a function, and the calculation result Y of the function will be the output of the protective layer record gradation inverter 9, and it will become the energy in the case of recording a protective layer.

Y=H (X) ... (A)

Moreover, in the case of a look-up table, the data with which the value of the brightness component from record color data generation equipment 3 was led from the table by becoming the address of a look-up table (memory) serve as an output of the protective layer record gradation inverter 9.

[0026] The color component adder 8 is a color component adder adding the brightness component from the color component data from record color data generation equipment 3, and brightness component calculation equipment 7. The color component data from record color data generation equipment 3 to the color component adder 8 are R, G, B, Y, M, C, etc., and perform addition and subtraction with a brightness component. As an example of an output, when a brightness component is set to K, they are K+ color, K-color, and a color. - There is combination, such as the K, color 1+ color +K, and K-color 1-color 2. (A color, a color 1, and a color 2 are one in R, G, B, Y, M, and C) . The color component adder 8 inputs into the protective layer record gradation inverter 9 the result of having subtracted and added of the brightness component and the color component, and changes it into the energy at the time of protective layer record here.

[0027] Head data generation equipment 4 is changed into the signal aspect by which gradation data are received from record color data generation equipment 3 when recording Y, M, and C each color, and a thermal head can record the received gradation data on the detail paper, and records an image on data-logging paper by the thermal head 5 (imprint). On the other hand, when recording a protective layer, head data generation equipment 4 receives the output from the protective layer record gradation inverter 9 which changes the brightness component from brightness component calculation equipment 7 into protective layer record energy data, changes it into the signal aspect by which a thermal head 5 can record this on the recording paper, and records a protective layer on the recording paper by the thermal head 5 (imprint). Therefore, a protective layer can be recorded according to the brightness of a record image, and the printed record image can be shown in three dimensions by changing protection layer thickness according to the brightness component of the inputted picture signal.

[0028] The configuration of the recording device concerning the gestalt 2 of gestalt 2. implementation of operation is the same as that of drawing 1 . With the gestalt 2 of operation,

after adding the color component of arbitration to the extracted brightness component by the color component adder 8, according to the value, it changes into the energy of protective layer record with the protective layer record gradation inverter 9, and a protective layer is recorded on it. The color components of arbitration are things, such as the value and − (R−Y) which are computed from the combination of R−Y, G−Y, B−Y or those addition, and subtraction, and G−B, when its attention is paid to a certain pixel which consists of three colors of R, G, and B and the brightness component is set to Y. And the color of arbitration can be set up by MPU1 based on the printed color adjustment of liking of a user or an image. According to the brightness component of an image and the color component of arbitration which were inputted, by changing protection layer thickness, the printed record image can be shown in three dimensions, and the color of arbitration can be emphasized in three dimensions.

[0029] That is, the color component adder 8 is a color component adder adding the brightness component from the color component data from record color data generation equipment 3, and brightness component calculation equipment 7. The color component data supplied to the color component adder 8 from record color data generation equipment 3 are R, G, B, Y, M, C, etc., and addition with a brightness component and subtraction are performed here. As an example of an output, when a brightness component is set to K, they are K+ color, K−color, and a color. − There is combination, such as the K, color 1+ color +K, and K−color 1−color 2. (A color, a color 1, and a color 2 are one in R, G, B, Y, M, and C) . The color component adder 8 inputs into the protective layer record gradation inverter 9 the result of having subtracted and added of the brightness component and the color component, and is changed into the energy at the time of protective layer record here. The following is the same as the gestalt 1 of operation.

[0030] The gestalt 3 of implementation of this invention is explained about drawing below gestalt 3. of operation. Drawing 2 is the block diagram of the recording apparatus concerning the gestalt 3 of operation. Drawing 2 is equipped with the protective layer gradation data storage 6, the brightness component storage 10, and the brightness component profile emphasis equipment 11 other than each block shown in drawing 1 . In addition, MPU1 is constituted so that each block of those other than a thermal head can be controlled (not shown, since connection becomes complicated here). Since others are the same as that of drawing 1 , the same sign is attached and explanation is omitted.

[0031] 6 is the gradation data storage for protective layers for the protective layer recorded all over the detail paper, before recording a protective layer according to a brightness component, or after recording a protective layer according to a brightness component. The gradation data equivalent to the energy used when recording a protective layer with the same gradation (energy) all over the recording paper are stored here. 10 is brightness component storage (memory) with which only the number of pixels as occasion demands memorizes the brightness component computed with brightness component calculation equipment 7 as a reference pixel at the time of brightness component profile emphasis equipment 11 performing profile emphasis to the brightness component of arbitration. By the way, to the whole detail−paper surface, when recording a protective layer, gradation data are inputted into head data generation equipment from the gradation data storage 6 for protective layers, when recording a protective layer according to a brightness component, gradation data are inputted into head data generation equipment from a protective layer record gradation inverter, and this control is performed by MPUI.

[0032] An example of the pixel configuration of profile emphasis is shown in drawing 3 . The round head in drawing is 1 pixel, and shows the brightness component. In drawing 3 , the pixel by which profile emphasis of the X is carried out, and A, B, C and D show a reference pixel. The gradation value of X is compared with the gradation value of the reference pixel A, and the value regular according to the value of X−A is added to X at the time of −Z<X−A<Z (Z is a positive number). It carries out similarly about B, C, and D. Profile emphasis is given to X according to this activity. In addition, in the case of this drawing 3 , the number of a reference pixel is 4, and the coordinate of A, B, C, and D is fixed, and its coordinate is [the number of a reference pixel is arbitrary and] also arbitrary.

[0033] In the example of drawing 3 , the brightness component storage 10 should just memorize

the brightness component for three lines. The protective layer record gradation inverter 9 receives the brightness component by which profile emphasis was carried out from brightness component profile emphasis equipment 11 like the gestalt 1 of operation, and outputs the energy which records a protective layer according to this value. 8 is a color component adder adding the brightness component by which profile emphasis was carried out from the color component data from record color data generation equipment 3, and brightness component profile emphasis equipment 11. This color component adder 8 inputs into 9 the result of having subtracted and added of the brightness component by which profile emphasis was carried out, and the color component, and changes it into the energy at the time of protective layer record in 9.

[0034] Therefore, in order to give profile emphasis to the brightness component computed with brightness component calculation equipment 7 (extract) Memorize the extracted brightness component to the display brightness component store 10, and the memorized display brightness component data are made into a reference pixel if needed. (The energy of a record sake being increased or a protective layer's being reduced) and profile emphasis can be given to the energy for recording the protective layer called for based on the brightness component by adding the data for profile emphasis using brightness component profile emphasis equipment 11. By changing protection layer thickness by this according to the brightness component of the inputted image, while being able to show the printed record image in three dimensions, by giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful. It is because the piece of the exfoliation from the ink sheet for protection of the protective layer applied to an edge part will become good if the energy added to the edge part of an image increases when recording a protective layer by giving profile emphasis (increment in a heating value).

[0035] Moreover, before recording a protective layer according to the brightness component which gave profile emphasis, after imprinting a protective layer with fixed energy all over the recording paper with the output of the gradation data storage 6 for protective layers, according to a brightness component, the energy of protective layer record can be computed further, and a protective layer can be recorded. Thereby, while being able to protect the image of the whole recording paper surface, by being able to show the printed record image in three dimensions, and giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful.

[0036] Moreover, after computing the energy of protective layer record according to the brightness component which gave profile emphasis and recording a protective layer, a protective layer is recordable with still more fixed energy all over the recording paper with the output of the gradation data storage 6 for protective layers. Thereby, while being able to protect the image of the whole recording paper surface, by being able to show the printed record image in three dimensions, and giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful.

[0037] Moreover, after adding the color component data of arbitration to the brightness component which gave profile emphasis by the color component adder 8, the energy of protective layer record can be computed according to the value, and a protective layer can be recorded. Thereby, while being able to protect the image of the whole recording paper surface, by being able to show the printed record image in three dimensions, and giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful, and the color of arbitration can be emphasized in three dimensions. Control of how to record a protective layer, such as recording the protective layer which gave complete record and profile emphasis of an above-mentioned protective layer, is performed by MPU1.

[0038] The gestalt 4 of implementation of this invention is explained about drawing below gestalt 4. of operation. Drawing 4 is the block diagram of the recording apparatus concerning the gestalt 4 of operation. The point that drawing 4 differs from drawing 2 is that were prepared instead of

the brightness component storage 12 after conversion being the brightness component storage 10 of drawing 2 , and the path of the protective layer record gradation inverter 9 has changed. In addition, MPU1 is constituted so that each block of those other than a thermal head can be controlled (not shown, since connection becomes complicated here).

[0039] Actuation is explained below. Table conversion is carried out with the protective layer record gradation inverter 9, the data of the brightness component outputted from brightness component calculation equipment 7 are changed into the data of protective layer record gradation, and brightness component profile emphasis equipment 11 performs profile emphasis like what was explained with the gestalt 3 of operation to the brightness component after conversion of arbitration (data of the energy for the protective layer record after table conversion was carried out). In order to perform profile emphasis, as for the brightness component storage 12 after conversion, only the number of pixels as occasion demands memorizes the brightness component after conversion (memory). The color component adder 8 adds the brightness component after conversion by which profile emphasis was carried out from the color component data from record color data generation equipment 3, and brightness component profile emphasis equipment 11 like the gestalt 3 of the above-mentioned operation. Since the color component adder's 8 output is the result of subtracting and adding of the brightness component after conversion and color component by which profile emphasis was carried out, since it is converted into the energy of protective layer record, the direct input of it is already carried out to head data generation equipment 4.

[0040] According to the brightness component extracted with brightness component calculation equipment 7, change into the energy for protective layer record with the protective layer record gradation inverter 9, and therefore, the changed brightness component after conversion Once, the brightness component store 12 after conversion memorizes, and the memorized brightness component data after conversion are used as reference data. After giving profile emphasis with brightness component profile emphasis equipment 11 to a certain brightness component after conversion, the energy of protective layer record is computed according to the brightness component after conversion by which profile emphasis was carried out, and a protective layer is recorded. By changing protection layer thickness by this according to the brightness component of the inputted image, while being able to show the printed record image in three dimensions, by giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful.

[0041] Moreover, before recording a protective layer according to the brightness component after conversion which gave profile emphasis, after imprinting a protective layer with fixed energy all over the recording paper with the gradation data storage 6 for protective layers, according to the brightness component after conversion, the energy of protective layer record can be computed further, and a protective layer can be recorded. Thereby, while being able to protect the image of the whole recording paper surface, by being able to show the printed record image in three dimensions, and giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful.

[0042] Moreover, after computing the energy of protective layer record according to the brightness component after conversion which gave profile emphasis and recording a protective layer, a protective layer is recordable with fixed energy all over the recording paper with the gradation data storage 6 for protective layers. Thereby, while being able to protect the image of the whole recording paper surface, by being able to show the printed record image in three dimensions, and giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful.

[0043] Moreover, after adding the color component data of arbitration to the brightness component after conversion which gave profile emphasis by the color component adder 8, the energy of protective layer record can be computed according to the value, and a protective layer can be recorded. Thereby, while being able to protect the image of the whole recording paper

surface, by being able to show the printed record image in three dimensions, and giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful, and the color of arbitration can be emphasized in three dimensions. Control of how to record a protective layer, such as recording the protective layer which gave complete record and profile emphasis of an above-mentioned protective layer, is performed by MPU1.
[0044]
[Effect of the Invention] As explained above, according to this invention, a protective layer can be recorded according to the brightness component of a record image, and the printed record image can be shown in three dimensions by changing protection layer thickness according to the brightness component of the inputted image.
[0045] Moreover, since the protective layer of fixed thickness or concentration is recorded all over the recording paper before recording a protective layer according to a brightness component, while being able to protect the image of the whole recording paper surface, a record image can be shown in three dimensions.
[0046] Moreover, since the protective layer of fixed thickness or concentration is recorded all over the recording paper after recording a protective layer according to a brightness component, while being able to protect the image of the whole recording paper surface, a record image can be shown in three dimensions.
[0047] Moreover, since a protective layer is recorded on it according to the value after adding the color component of arbitration to the brightness component extracted according to the brightness component, by changing protection layer thickness according to the brightness component of an image and the color component of arbitration which were inputted, the printed record image can be shown in three dimensions, and the color of arbitration can be emphasized in three dimensions.
[0048] Moreover, by changing protection layer thickness according to the brightness component of the inputted image, while being able to show the printed record image in three dimensions, by giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful.
[0049] Moreover, since a protective layer is recorded with still more fixed energy all over the recording paper after computing the energy of protective layer record according to the brightness component which gave profile emphasis and recording a protective layer While being able to protect the image of the whole recording paper surface, by being able to show the printed record image in three dimensions, and giving profile emphasis to a protective layer, the piece of the exfoliation from the ink sheet of a protective layer can be improved, and the condition of a protective layer imprint becomes beautiful.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the recording apparatus concerning the gestalt 1 of implementation of this invention, and the gestalt 2 of operation.
[Drawing 2] It is the block diagram showing the recording apparatus concerning the gestalt 3 of implementation of this invention.
[Drawing 3] It is a pixel block diagram explaining profile emphasis of the recording device concerning this invention.
[Drawing 4] It is the block diagram showing the recording apparatus concerning the gestalt 4 of implementation of this invention.
[Drawing 5] It is the block diagram showing the conventional recording apparatus.
[Drawing 6] It is drawing showing the pattern of the protective layer of the conventional recording device.
[Description of Notations]
1 MPU, 2 An image store, 3 Record color data generation equipment, 4 Head data generation equipment, 5 A thermal head, 6 The gradation data storage for protective layers, 7 Brightness component calculation equipment, 8 A color component adder, 9 A protective layer record gradation inverter, 10 A brightness component store, 11 Brightness component profile emphasis equipment, 12 After [conversion] brightness component store.

[Translation done.]